

## CLAIMS:

I claim:

1. An anti-islanding apparatus for isolating a power source from a failed electrical grid, comprising:
  - a power converter connectable between said power source and said grid;
  - a means for measuring a voltage of said grid;
  - a means for calculating a voltage trend in said grid voltage, using a present grid voltage measurement and a prior grid voltage measurement;
  - 10 a means for calculating a positive feedback power converter control signal based on said voltage trend;
  - a control circuit connected to said power converter, wherein said control circuit applies said control signal to said power converter; and
  - 15 a means of disconnecting said power source from said grid when said present grid voltage is outside pre-defined limits.
2. An anti-islanding apparatus according to claim 1, wherein said control signal comprises an acceleration function.
- 20 3. An anti-islanding apparatus according to claim 1, further comprising a means for measuring a frequency of said grid;
  - a means for calculating a frequency trend in said grid frequency using a present grid frequency measurements and a prior grid frequency measurement;
  - a means for calculating said positive feedback power converter control signal based on said frequency trend; and
  - 25 a means of disconnecting said power source from said grid when said present grid frequency is outside pre-defined limits.
- 30 4. An anti-islanding apparatus according to claim 3, wherein said control signal comprises an acceleration function.

5. An anti-islanding apparatus according to claim 1, wherein when said power source is operating in a power limited condition, said control signal commands a lower power output in all cases.

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6. An anti-islanding apparatus according to claim 1, wherein said means for measuring operates continuously.

7. An anti-islanding apparatus according to claim 1, wherein said means for measuring operates at intermittent intervals.

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8. An anti-islanding apparatus for isolating a power source from a failed electrical grid, comprising:

a power converter connectable between said power source and said grid;  
a means for measuring a frequency of said grid;  
a means for calculating a frequency trend in said grid frequency using a present grid frequency measurements and a prior grid frequency measurement;  
a means for calculating a positive feedback power converter control signal based on said frequency trend;  
a control circuit connected to said power converter, wherein said control circuit applies said control signal to said power converter; and  
a means of disconnecting said apparatus from said grid when said present grid frequency is outside pre-defined limits.

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25 9. An anti-islanding apparatus according to claim 8, wherein a grid phase is calculated from said grid frequency.

10. An anti-islanding apparatus according to claim 8, wherein said means of measuring operates continuously.

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11. An anti-islanding apparatus according to claim 8, wherein said means of measuring operates at intermittent intervals.

12. A method of preventing islanding of a power source on a distributed grid comprising the steps:

5 measuring grid voltage;

calculating a voltage trend in said grid voltage, using a present grid voltage measurement and a prior grid voltage measurement;

10 calculating a power converter control signal in a same direction as said voltage trend;

applying said power converter control signal to said power converter; and disconnecting said power source when said present grid voltage measurement is outside acceptable limits.

15 13. An anti-islanding apparatus according to claim 12, further comprising:

measuring grid frequency;

calculating a frequency trend in said grid frequency, using a present grid frequency measurement and a prior grid frequency measurement;

20 calculating a power converter control signal in a same direction as said frequency trend;

applying said control signal to said power converter; and

disconnecting said power source when said present grid frequency measurement is outside acceptable limits.

25 14. A method of preventing islanding of a power source on a distributed grid according to claim 12, wherein said calculation of power converter control signal uses an accelerating function.

30 15. A method of preventing islanding of a power source on a distributed grid according to claim 12, further comprising;

measuring grid phase;

calculating a phase trend in said grid phase, using a present grid phase measurement and a prior grid phase measurement;

calculating a power converter control signal in a same direction as said phase trend;

applying said control signal to said power converter; and

disconnecting said power source when said present grid frequency measurement is outside acceptable limits.

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A method of preventing islanding of a power source on a distributed grid according to claim 12, wherein said steps of measuring, calculating, processing, calculating and applying are performed continuously.

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A method of preventing islanding of a power source on a distributed grid according to claim 12, wherein said steps of measuring, calculating, processing, calculating and applying are performed at intermittent intervals.

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A method of preventing islanding of a power source on a distributed grid according to claim 14, wherein said acceleration function is comprised of linear, exponential, and geometric functions.

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A method of preventing islanding of a power source on a distributed grid according to claim 12, wherein said power converter control signal lowers voltage in a power limited source.

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A method of preventing islanding of a power source on a distributed grid comprising the steps:

measuring grid frequency;

calculating a frequency trend in said grid frequency, using a present grid frequency measurement and a prior grid frequency measurement;

calculating a power converter control signal in a same direction as said frequency trend;

applying said control signal to said power converter; and  
disconnecting said power source when said present grid frequency measurement is outside acceptable limits.

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